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# Pion scattering in finite volume within the Inverse Amplitude Method: Extension to moving frame

*Saturday, 27 June 2026 15:00 (2 hours)*

We study the effect of a finite volume for pion-pion scattering within Chiral Perturbation Theory (ChPT) and the Inverse Amplitude Method (IAM) in a box for different boost's. Our full ChPT calculation takes into account the discretization not only in the $s$-channel loops but also in the $t, u$- channels and tadpole contributions. Hence, not only the unitarity right-hand cut but also the continuum contributions to the left-hand cut are calculated in the finite volume. A proper extension of the standard Veltman-Passarino identities is needed, as well as a suitable projection on the internal space spanned by the irreducible representations (irreps) of the finite groups, based on either a finite set of kubic harmonics or the matrices which represent the irreps properly. From the ChPT we construct the IAM in the internal space, which provides the full volume dependence of the interacting energy levels of two pions scattering in the finite volume. Our results for various sets of low-energy
constants show sizable corrections with respect to previous analyses in the literature for $m_\pi L < 2$, being compatible with lattice data on energy levels.
We expect that our analysis and results will help to optimize the process of determining energy levels and phase-shifts with higher accuracy.

## Collaboration

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